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ABSTRACT

This module is part of a set of management and supervisor training (MAST) materials developed by the Department of Energy for the Waste Isolation Division. Its stated purpose is to enable trainees to solve problems and make decisions in an efficient and effective manner. The first section of the module is an introduction that includes a terminal objective and opening remarks intended to focus the trainees' attention on the subjects discussed in the module. Most other module sections begin with a list of enabling objectives. Many sections contain "critical incidents" or real-life occurrences at the Department of Energy's Waste Isolation Pilot Plant that relate to the section topic. Some illustrate effective management practices, and some illustrate ineffective ones. Each critical incident includes "lessons learned" information. Section topics include the following: problem solving, creative thinking and innovation, decision making, idea generation techniques, and fostering an innovative work environment. A list of "smart moves" is included near the end of the module. Contains 20 references and a practice test. Answers and feedback for the test are provided. (YLB)

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ED 395 151



Waste Isolation Division (WID)

Management and Supervisor Training (MAST) Program

# Problem Solving and Decision Making

## MAS-105

This module was prepared by:

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Manager, Date
Productivity, Quality and Communications

This module was approved by:

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Organizational Development Date

### Trainee Information

Trainee Name: _____

Trainee SS#: _____

Date Module Started: _____

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## A. Module Introduction

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### Terminal Objective

Upon completion of this module, trainees will be prepared to solve problems and make decisions in an efficient and effective manner.

Mastery of the terminal objective will be demonstrated by scoring 80 percent or higher on the module examination.

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As a manager or supervisor, your workdays are filled with challenging problems and decisions. Some of the best practices for efficiently solving problems and arriving at good decisions are distilled within these pages. Though we may be armed with the best practices for either challenge – problem solving or decision making – occasionally we reap unacceptable results.

Continuously improving your problem-solving and decision-making skills produces the best possible results – with the available information and within a finite schedule. Good solutions and decisions are the sum of an equation that includes *data* plus *time available* to take action plus *results*.

Wise managers and supervisors recognize that seeking perfection invites organizational gridlock. The purpose for this module is to help you increase the skills you already have to think straight, stay out of gridlock, and use logical processes for problem solving and decision making within your group and throughout the WID.

## B. Problem Solving

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### Enabling Objectives

Upon completion of this section, trainees will be able to:

1. Identify good practices for solving problems.
2. Identify practices to avoid when solving problems in the workplace.
3. Given a scenario, evaluate the manager's effectiveness in solving problems.

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### 1. Using problem analysis techniques

How do you define a problem? How do you decide what actions to take when an issue or event has a negative impact on you and your work team? To resolve problems, we begin by defining the problem clearly and accurately. We identify objectives and search for the best solution.

Much of our work involves analyzing problems, setting strategy, negotiating projects, and coaching employees. Teaching your employees good problem identification practices involves critical thinking skills to help them deal with requirements in Department of Energy orders, corporate directives, job descriptions, or policies and procedures at the WID.

Here's how the problem-solving process is generally outlined:

- *Define the problem*

Gather information about all known factors. Suggest possible cause/effect relationships. Analyze and write down your description of the core problem. If you don't define the problem, you can't reach an effective solution because you could focus on the wrong issue and waste time. For example, if the lights go out in your office, you need to *define* the problem to Maintenance. Simply saying it's an electrical problem could waste their time.

- *List possible causes*

Use idea generation techniques to identify possible causes. Don't focus on solutions yet. You need to list the possible causes to determine the most probable ones and eliminate those that don't make sense. Consider the lights-out example. What are the possible causes? A cut power line? An overloaded circuit? Worn-out bulbs?

- *Identify the causes*

Identify the root and contributing causes of the problem. Use cause analysis, which includes identifying the root cause of an event, the contributing cause(s), and associated corrective actions. Use group problem solving as needed. Cause analysis narrows your search and avoids wasting time investigating illogical causes. In the lights-out case, you can evaluate and eliminate improbable causes. Is every light out in the office, or just one or two? Did someone turn on additional equipment? Is a power outage scheduled? Asking questions to evaluate possible causes eliminates illogical ones.

- *Identify the solution*

Establish criteria to arrive at the best solution with the given data, factors, and schedule. Seek feedback about each solution e.g., data, responses from those affected by your solution, impact on work processes, costs. If you skip this step, you may pick a solution that doesn't solve the problem or creates a new problem. In the lights-out example, you can identify the solution associated with each possible cause. You don't need to check circuit breakers (possible cause) if you confirm that a power outage (root cause) is in effect.

- *Take corrective action*

Identify the corrective actions necessary to prevent the problem from recurring. Take action to solve the problem. The problem can't be resolved if you don't act. For example, you are only reacting if you wait for the lights to come back on. You can be proactive by taking corrective action – reducing the load on the circuit or finding out when the power will be restored, for example.

- *Follow up*

Evaluate the results qualitatively or quantitatively. Monitor the solution, and make corrections as necessary. If you fail to monitor the solution, you won't know if your action was effective. In the lights-out case, you should follow up to determine if the problem recurs. If a circuit was overloaded, you should follow up to determine if the problem recurs after the solution is implemented.

*Assess your problem-solving approach*

A practical starting point for solving problems efficiently is to assess your preferred problem-solving approach. In the book, *Thinking Better*, authors David Lewis and James Greene describe two fundamental styles for problem solving, and recommend that you develop your ability to use both. Take a couple of minutes to determine your preferred style by marking the answer which most closely reflects your choice on each of the following questions adapted from the book:

1. I prefer to solve most problems:

   (a) By relying on a logical approach
   (b) By relying on hunches and inspiration

2. If I must choose one of two professions, I would rather be:

   (a) A mathematician
   (b) An advertising copywriter

3. I think people should solve problems by:

   (a) Careful analysis - you can't afford to overlook details
   (b) Thinking up a large number of possible solutions - one might work

4. If searching for an address in a strange city, I would rather:

   (a) Look it up on a street guide
   (b) Ask a local resident how to get there

5. Most problems can be solved by:

   (a) A step-by-step process of elimination
   (b) Trying out all the possible solutions that come to mind

6. If I have misplaced something, I usually:

   (a) Search methodically through every possible hiding place until I find it
   (b) First think of the places it might be, then check them out

7. If I'm asked for advice, I usually:

   (a) Offer a few carefully considered suggestions which are likely to work
   (b) Come up with a large number of suggestions which may or may not work

8. When I'm seeking an answer to a problem, I'm most successful:

   (a) Working out a solution on my own
   (b) Exchanging ideas as part of a team

9. When a piece of equipment breaks down, the best way of fixing it is to:

   (a) Take it apart, component by component, until the problem is found
   (b) Get a general idea of what might be wrong before trying out suitable repairs

Total the (a) and (b) responses to your assessment quiz. If you scored five or more (a) selections, you prefer a "pathfinder" approach. If you selected five or more (b) choices, you are more likely a "helicopter pilot." Both methods have advantages and limits. There are some situations in which both approaches are useful. Let's consider the characteristics of each type of problem solver.

The pathfinder works systematically to find a single, correct answer. If you are a pathfinder, you are probably careful, patient and logical, but generally intolerant of uncertainty. You dislike hunches, ambiguity and guesswork. When you are faced with a problem, you probably analyze available information in detail before reaching a conclusion.

Helicopter pilots prefer to take a more general view of tasks and are less focused on being methodical. They want to get a broad look at the task then proceed guided by their intuition, rather than by analysis. If you are a helicopter pilot, you rapidly scan available information to come up with a variety of possible solutions which you can put to the test. You may reach a solution quicker than the pathfinder, but you run the risk of overlooking details.

When you are resolving a complex problem, you may benefit from teaming up with someone who uses the other approach. For example, if you are gathering information for a report (you are a pathfinder), the helicopter pilot may help you arrive at a "big picture" solution if you must sift through a variety of data.

## 2. Root cause analysis

Managers and supervisors face problems every day. Determining the root cause – rather than perceived causes – can help prevent recurrence of problems. A *root cause* is defined as the most basic causal factor or factors that, if corrected, will prevent recurrence of an undesirable event.

Root cause analysis gives you a logical framework for solving problems. At the WID, Technical Training offers a course that teaches root cause analysis. You and your employees can benefit from learning and applying the technique to determine the root cause of problems.

In addition to the root cause of an event, there are other factors which impact an occurrence. These include contributing cause(s) and the direct cause. *Contributing causes* add to an event but, by themselves, couldn't have caused the undesirable occurrence. A *direct cause* is that which directly resulted in the event. For example, an operator could misalign a valve or corrosion could erode a pipe, causing a rupture. These are direct causes of the rupture.

Why is root cause analysis important to problem solving? Because finding the root cause is required for recurring and reportable events at the WIPP. An *event* is a real-time occurrence that could seriously impact the project's mission. Any undesirable event is reportable to the Central Monitoring Room. Reportable events are analyzed by the occurrence reporting process, which includes root cause analysis.

Generally, root cause analysis includes any method(s) to identify the root cause of an event, the contributing cause(s), and associated corrective actions. We use root cause analysis at WIPP because it has proven to be effective for commercial nuclear facilities, the aviation, automobile and chemical industries, and for military organizations to prevent event recurrence.

The DOE complex applies root cause analysis out of concern for the welfare of employees, the plant, the public and the environment. There are economic factors, too. Undesirable events cost taxpayer dollars. The law requires use of root cause analysis for events covered by the Occupational Safety and Health Act (OSHA). The DOE requires root cause analysis for compliance with DOE Orders 4330.4A "Conduct of Maintenance," 5480.19 "Conduct of Operations," and 5000.3B "Occurrence Reporting and Processing of Operations Information."

The step-by-step process for root cause analysis includes:

- Data collection
  - Identify the direct cause
  - Collect data
  - Review the data

- Assessment
  - Analyze the event
  - Determine/validate the root and contributing causes

- Correction of the problem
  - Identify, review and implement corrective actions

- Information dissemination
  - Communicate the results
  - Notify affected groups of resolution/action plans

- Follow-up actions
  - Conduct an effectiveness review

Consult the Technical Training course, TRG-296, "Root Cause Analysis," and Organizational Development for more information about root cause analysis.

### 3. Specific root cause analysis methods

There are other proven methods for event analyses:

• *Event and causal factor analysis* - Used for multi-faceted problems with long or complex causal factor chains. Provides a visual display of the process and identifies probable contributors to the event. This method is time-consuming and requires familiarity with the process to be effective. The analysis requires a broad perspective of the event to identify unrelated problems.

• *Change analysis* - A tool for root cause analysis helps you identify where events went wrong. You can learn to ask the right questions to identify both when and where the process went off track. Change analysis can take you quickly past assumptions and forward to finding the root cause.

• *Barrier analysis* - A structured method to examine the success or failure of management systems in the event of a problem. Targets for precautions, barriers which protect the target, and effective and ineffective barriers are all identified through barrier analysis. Barrier analysis alone isn't guaranteed to direct you to the root cause of a problem.

• *Management oversight and risk-tree (mort/mini-mort) analysis* – Use this technique when experts aren't available to ask the right questions or whenever the problem is recurring. This method is helpful in solving programmatic problems. Risk-tree analysis can be used with limited training. A list of questions is provided. This may only identify areas of cause, not specific causes. If risk-tree analysis fails to identify problem areas, get additional help or use causal factor analysis.

• *Human performance evaluations* – This method is useful when people are involved in the cause of the problem. Human performance evaluations provide thorough analysis with no shortcomings if the process is followed closely. Use of human performance evaluation requires training.

• *Process diagraming* – A graphical representation of events that led to an occurrence. Enables you to establish a chronology that led to a problem. Used alone, the process diagram won't enable you to determine the root cause; however, the diagram is a tool to provide you a picture of the known information. Process diagraming can identify inherent flaws in logic and prevent you from stopping short of determining the root cause.

• *Kepner - Tregoe method* – Applied to major concerns where all factors require thorough analysis. The highly structured approach focuses on all aspects of the occurrence and problem resolution. The methodology may be more comprehensive than is required. Use of this technique requires Kepner-Tregoe training.

Ask Organizational Development if you want help applying these event analysis methods.

## 4. Leading problem-solving groups

By design or necessity, problem solving is sometimes accomplished in a group setting. Learn to recognize both the strengths and weaknesses of group problem solving. It can work for you or against you – depending upon how well you understand group dynamics and your leadership role as a facilitator. Contact the Productivity, Quality and Communications section if you want someone to facilitate a problem-solving group.

When you lead a meeting or facilitate group problem solving, start by defining the purpose and goals for the session. Team processes typically include meeting mechanics, problem solving, idea generation, and consensus building. The facilitator ensures that a team leader follows these mechanics and puts them into action. The facilitator and the team leader are two different roles – one focuses on process (facilitator), the other on content (team leader).

*Good practices for facilitating or leading a group meeting*

The following design can accommodate changing needs as a group works through problem solving. New information emerges, expectations shift, issues expand or shrink. Be prepared to adjust to or manage group dynamics.

• Establish and communicate the agenda

Start on time. Outline the session to focus attention on what's important without interruption from telephones and visitors. Ask participants to be ready to jointly search for a solution, and to be prepared to reach a conclusion that could look different from their expectations now.

- Kick off the meeting with review

Review the purpose and general outcomes expected. Describe special roles, such as the group leader, facilitator, or the scribe taking meeting minutes.

- List participants' expectations in writing

Use large sheets of paper or a writing board so all participants see the expectations. Enable participants to take ownership by expressing their expectations. Allow only one person to speak at a time. Ask members not to engage in side conversations. Generate a variety of viewpoints and suggestions. Avoid nitpicking and criticism of ideas at this stage.

- Ask and write: How do we accomplish these expectations?

Ask the group to list the guidelines to foster a highly productive meeting for everybody. An atmosphere of openness and frank opinions produces the most useful solutions. Set standards for the group's behavior and encourage, but don't force, participation. To build consensus, don't vote and don't expect unanimous agreement.

- Explain the creative process

Breaking mindsets is key to creative problem solving. Some discomfort may be a sign that the group is thinking outside of the paradigm – breaking up mind habits and inviting innovative thinking into the process. Consensus may be difficult to reach within a diverse group. If you reach an impasse, ask dissenters some constructive questions: *What information do you require to support a decision? What has the group neglected to consider? How can the group build on an idea to arrive at a decision you can support?*

- Apply the creative cycle

Dive into the process step-by-step: 1) target 2) search 3) check, and 4) act. During the search phase, use a creative thinking strategy (e.g., brainstorming or brainwriting) that you select *prior* to the meeting. Use a strategy that best fits the group level.

- Stick to the strategy and process

The four phases of the creative cycle give balance to the group problem-solving process. A strategy drives you toward your goal. If the group gets stuck, off on a tangent, or bogged down after a break, pull the people back into the action. Review progress and solicit ideas for staying on track to conclusion. Keep discussion relevant to accomplishing the group's stated objectives.

- Nail down actions

Get a clear picture of what was accomplished, and what's left to do. In the event of a time squeeze, ensure that you target a few actions to keep the process moving. Decide whether a followup meeting or subgroup meeting is needed. Ensure that actions are assigned and due dates are set.

- Critique the meeting

Ask which group actions were effective and which were ineffective. Rate the meeting effectiveness on a low to high scale. Gather suggestions on what could be improved at the next session. Finish the meeting on time. Publish meeting minutes within 24 hours.

*Advantages of group problem solving*

- Wider range of knowledge and experience
- Increased energy and resources to attack the problem
- Motivation to work harder because others are depending on participants

*Drawbacks of group problem solving*

- Pressure to conform and avoid new or controversial options
- Hesitance to be frank or critical about others' ideas
- Substituting talk for action
- Relying on others to do the work

*Good problem-solving practices*

- Communicate to your employees that problem *identification* is important

  Reward employees who take the initiative to identify and solve problems.

- Reinforce that risk avoidance isn't always preferred over taking measured risks

- Practice open and informal communication to make your expectations clear

- Be alert to your nonverbal communication as well as your employees' behavior, such as tone of voice, facial expression, posture or silence.

- Learn why your employees don't confront problems; help them take action

- Periodically ask employees what problems exist; compare their lists with yours

- Ensure that you and your staff are approaching problems with the same standards, goals and expectations.

- Search for solutions along pathways you seldom use

You don't have to store up creative thoughts; you can stimulate your mind to reprocess data into a different arrangement. For example, you have been handed an additional work assignment. How would you typically structure the workload to complete the project - dedicate one employee, appoint a work team, do it yourself? Consider new options. Perhaps another work group has valuable expertise to share. Other facilities may have completed this assignment, drastically reducing production time if you adapt their solutions.

*Practices to avoid*

Don't get mired in illogical thought processes. Researcher and author Stuart Chase described some mental detours we take and fallacies we should avoid when we are engaged in problem solving and decision making:

1) *Overgeneralizing* - Look for patterns in information; but avoid reaching invalid conclusions by collecting enough data to ensure that you see a valid pattern. It's overgeneralizing to say, "All Santa Fe residents oppose WIPP."

2) *Give 'em an inch* - Most logic fallacies contain a strong emotional content that leads to prejudicial or irrational conclusions based on scant or faulty data e.g., "If the this oversight group reviews our report, then they'll want to review all our reports." Insist on real evidence.

3) *Personal attack* - Also known as name-calling. Discrediting the other party distracts from the facts and uses an emotional argument, e.g., "Those tree huggers don't know what they're talking about."

4) *Superstitious behavior* - A classic fallacy. Just because one event follows another doesn't indicate a cause-and-effect relationship, e.g., "Bob and Mary got promotions after they completed that training. I'm going to take that training so I can get promoted."

5) *Analogies* - An analogy is based on the assumption that if two events, problems, etc. are alike in some ways, they must be alike in other ways. They are useful to illustrate a principle, but shouldn't be taken too far. Watch out for comparison of circumstances or people to irrelevant cliches, such as, "Where there's smoke, there's fire."

6) *What authorities say* - Citing authorities or statistics can be a smoke screen to avoid arguing the real issues; the key is sticking to relevant facts. "Why should I wear my safety glasses when safety statistics indicate that most on-the-job injuries occur to fingers and hands?"

7) *Crowd appeal* - Useful tactic to appeal to our "herd instinct" - our need to be on the emotionally positive side of an issue, to be part of a group, or to position ourself as a protector of others. "Well, the rest of the department says that's the wrong approach to this project," encourages you to join the bandwagon.

8) *Circular arguments* - You can be the victim or perpetrator when what you debate is offered as proof for the conclusion, couched in uppity language. Catch 22 is a classic example of the circular argument; e.g., WIPP cannot start up until the test phase is conducted, but opponents say that on-site tests are unnecessary or too hazardous.

9) *Oversimplifying* - Relies on slogans to obscure issues. Reduces arguments to mere opinions supported by circular debate or overgeneralization, e.g., "You can't learn creativity; you have to be born with it."

## C. Creative Thinking and Innovation

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### Enabling Objectives

Upon completion of this section, trainees will be able to:

1. Identify good practices for creative thinking and innovation.

2. Identify practices that squelch creative thought and innovation.

3. Given a scenario, evaluate the manager's effectiveness at creative thinking and innovation.

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Why is creativity important? Creativity helps us solve problems and make positive breakthroughs. With increased creativity, we welcome innovative approaches and appreciate fresh opportunities. The creative mind works synergistically, exchanging data and building momentum.

Consider how a computer works. Increasingly powerful computer programs provide us with vast possibilities for processing, analyzing, and presenting data. Our brains have a similar capacity for combining information that can be translated into novel approaches.

Because our brains are more complex than the most powerful software, most of us certainly do have the capacity for creativity. You're cheating yourself out of some innate brainpower if you declare that you aren't creative and leave it to your employees who are "more right-brained."

Additional research has led to evidence that combining different types of thinking results in greater learning. For example, participants in one study doubled their performance on writing and speaking tests by applying a combination of relaxation, imagination and concentration techniques. In another study, researchers documented increased performance by participants who practiced strong visualization and relaxation techniques.

One of the most important points about creative thinking is that our thinking styles can boost or limit our reasoning ability and productivity. The way we process information is key to our success.

### 1. Four phases of the creative cycle

In *Creative Thinking and Problem Solving*, John Fabian describes four phases of the creative cycle that apply to imaginative thinking for individuals and groups:

- *Determine the target*

Gather information about the issue and analyze the factors. Take aim on the factor that can benefit from fresh ideas. Settle on the necessary boundaries. Shape a question that will serve as a prompt for idea generation. For example: How can WID support the earliest waste disposal decision for WIPP?

- *Search for options*

Generate ideas with an appropriate technique. Step out of the paradigm – the typical way of thinking – to search for fresh strategies.

- *Check for fit*

What are the absolute requirements you must meet? Make sure the boundaries you consider are actual and not just mental. Match the new ideas to requirements and roadblocks. Determine what support is required to implement the solution. Pick the best choice.

- *Take action*

Get the idea into motion. Design, model, simulate, produce, dry-run, and market your choice.

The phases in the creative cycle outlined here are cyclical. They may require a series of iterations and refinements to reach a conclusion. You may revisit a step. As you get new data and a fresh perspective, you can jump forward or back in the cycle.

## 2. Creativity boosters

Psychologist Howard Gardner has a list of methods people typically use when they are being particularly creative. Most often the creative light bulb doesn't flash in your head with a turn-key solution to a problem. Gardner's "creativity finders" can boost your problem-solving skills:

- *Generalize the issue* – Adjust your perspective beyond immediate issues to seek solutions. Consider the problem from a higher or broader level. For example, equipment, supply or scheduling problems you and your employees encounter could have a causal relationship with other groups at the WIPP.

- *Specialize the issue* – Look for the details that will provide clues or a pattern that leads to a solution. Pulling out the magnifying glass can reveal characteristics you won't notice from a broader perspective.

- *Ferret out analogies* – When creativity (versus logic) is called for, find a situation that can be compared or contrasted to the present situation. Don't confuse this with logic, no matter how compelling the analogy seems. If you can't reason your way through a problem, an analogy could be useful. Can you compare/contrast WIPP to a commercial nuclear plant? Or to a mining operation?

- *Find smaller issues* – Find a simpler issue to resolve inside the larger problem. The success can transfer to other elements of the solution. We can examine the efficiency of our work processes as the entire division seeks to achieve a specific level of productivity improvement.

- *Propose a solution and work backwards* – Mental flexibility is essential for the success of this practice. Come up with multiple solutions without fixating on any one. This method is most useful when you are familiar with the variety of possible solutions and can apply logic to eliminate illogical solutions.

- *Describe the characteristics of your desired solution* – You don't have to know the solution to describe the features you desire. For example, you want a filing system to fit into a particular space, organized by specific topics that are coded numerically. By describing the features, you can build the solution.

## D. Decision Making

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### Enabling Objectives

Upon completion of this section, trainees will be able to:

1. Identify good practices for making decisions in the workplace.
2. Identify practices to avoid when making decisions.
3. Given a scenario, evaluate the manager's effectiveness in making decisions.

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### 1. Using decisional analysis techniques

Decision theorists say "good decisions" don't always produce the desired results. Conversely, some "poor decisions" get good results. How can that happen if sound, logical processes are used for decision making?

Managers and supervisors who judge a decision only by the results short-circuit the decision-making process. Communicate to your employees that you are interested in the process they use to arrive at their decisions. Offer support for using a systematic process, but don't focus solely on the results.

Experts on decision making define a "good decision" as one that holds up in retrospect. With the resources and information available at the time the decision must be made, the good decision has the highest probability of producing the desired results.

*Assess your decision-making style*

You can use both intuitive and analytical styles for decision making if you know how to put both to work for you. Consider the differences between intuitive and analytical approaches.

*Intuition*

Your intuition enables you to know or feel something without using logic or reason. For example, you can use intuition to:

- Create ideas that provide a starting point for fresh thoughts
- Solve the "why" or the "should I" questions
- Break a deadlock in your mind among different strategies

*Analytical skills*

Your analytical skills help you use logic to examine and measure a problem. These skills can help you:

- Separate workable ideas from impractical ones
- Solve "how to" or "how many" problems when choices can be assessed with facts

In *Yes or No, Guide to Better Decisions*, Spencer Johnson applies what he learned through study and hindsight. Making better decisions starts with *how* we make them, to get better results. Johnson recommends asking a couple of questions:

- Am I meeting the real need, informing myself of options, and thinking it through?

  Yes __ No __

Ask yourself: *Is this a want or a need? What information do I need? Do I have options? If I pick option X, what will happen? Then what?*

- Does my decision show that I am honest with myself, trust my intuition, and know that I deserve better results?

  Yes __ No __

Ask yourself: *Have I told myself the truth? What would I decide if I had no fears about the results? What would I do if I decide I deserve better results?*

For each question, proceed if you decide "yes," or rethink if you decide "no." Use both aspects of decision analysis - logic and intuition - to consistently make better decisions.

## 2. Making a good decision

This module outlines a variety of quantitative (multivariate analysis) and nonquantitative (qualitative) decision-analysis techniques. Determine the right fit for you and your work group when you are involved in decision making. No single technique works in every case.
Analyze the situation to determine which process is likely to work best. Ask for assistance from Organizational Development if you want a group facilitator or more information.

*Quantitative decision making*

Quantitative decision making or multivariate analysis helps managers and supervisors rely on more than intuition, experience and luck in wrestling with real-life issues. You can more effectively work through tough-to-quantify tradeoffs and multiple choices. Quantification helps you analyze complex issues and confirm your hunches about the right choice.

- *Decision-tree analysis* - The oldest, most widely used decision analysis. Computer support can make turnaround quicker. Mechanics include specifying a tree, assigning values, and calculating results. The successful process includes a simple tree display, refinement of elements, use of models, team input, and senior managers' sponsorship.

• *Multiattribute utility analysis* - Specifies factors that affect a choice, makes trade-offs among the factors, and chooses the alternative that offers the best balance. Evolved out of decision analysis in support of governmental decisions that balance multiple objectives.

• *Factor analysis* - Summarizes a large number of variables into a smaller, more manageable body of information. Looks for descriptive relationships in data.

• *Multidimensional scaling* - Attempts to map perceptions of similarity as distances in a perceptual space. Computer software can map relative positions of data, based on associations. The software doesn't interpret the dimensions, but a skilled analyst can reach conclusions from information obtained from respondents.

Contact Productivity, Quality and Communications or Professional Development for more information about quantitative decision-making methods.

*Qualitative decision making*

Qualitative or nonquantitative decision making is called "humble decision making" by Amitai Etzioni in the Harvard Business Review. Why? Managers must often take action with partial information, when issues are gray - not black and white - and without time to complete a full analysis.

Successful strategies must take into consideration others' goals, cooperation, coalitions, and a variety of perspectives. Qualitative decision making requires flexibility, caution, and the capacity to proceed sometimes with half the desired information when that's necessary.

Sometimes we are overcome by opposing factors and are caught up in patterns that slow or halt good decision making:

- Defensive avoidance - delaying decisions unnecessarily
- Overreaction - making decisions impulsively to escape the anxious state
- Hypervigilance - obsessively collecting data instead of making a decision

What about the *really* tough decisions - when there's just no room for error? Dr. Barbara Varenhorst, a psychologist, and Daralee Schulman, a career and stress-management consultant, advise:

- You can't control the outcome; only the decision process

  Don't judge your decision on the basis of results alone.

- Identify needs and wants

  Jot them all down - even if some contradict. Don't get trapped by artificial boundaries - think outrageously! Imaginative reasoning is no more "outrageous" than stepping out of the paradigm. Webster's Ninth New Collegiate Dictionary defines "outrageous" as "exceeding the limits of what is usual."

- Rank needs and wants

  Separate *needs* (musts) from *wants* (desirables), then prioritize the wants.

- Make choices among the contradictory options

  Certainly customer needs, procedures and budgets provide us essential givens in the decision process, but keep an open mind to new approaches. Avoid do-it-by-the-book barriers with flexible thinking.

- Gather all the information to make your decision

  Use your time wisely to gather pertinent information, without procrastinating. Groups are more receptive to information that most members share before the discussion than that which only a few individuals were aware of beforehand. This is called a "hidden profile."

- Look at all consequences, alternatives, pros and cons

  Take full advantage of both your intuitive and analytical skills. Breakthrough ideas can pop into your head after hours of analyzing data and mulling over the range of possible solutions. The creative cycle enhances the possibility for arriving at higher quality solutions.

- Be objective throughout the process; don't let your emotions take control

  Be confident in your ability to make the best decision possible with the available information and time allotted for the issue. Emotions such as distrust, anger or anxiety put the brakes on creative problem solving.

- Determine the amount of risk you are willing to accept, then take these steps:

  1) Identify the safest alternative
  2) Pick the option with the best odds for success
  3) Select the choice with the most desirable outcome without considering the risk

- Eliminate all options that present a loss you can't live with - regardless of the odds for success

  Ask your customers - "What are the negative outcomes that can't be part of the risk of decision making?" Toss unacceptable options out before you get started.

- Visualize how to cope with possible negative consequences

  Unavoidable lessons learned can be valuable information for future decisions. However, creative decision making can help you avoid the pitfalls of hit-or-miss methods of generating solutions when the problem is too important to risk illogic.

- Devise a Plan B

What if Plan A falls through? Consider other alternatives if the best solution can't be implemented. The best solution is only as good as the implementation.

Contact Productivity, Quality and Communications or Professional Development for additional information about qualitative decision making.

*Good practices for decision making*

These tips work well within the decision analysis framework to ensure that you consistently arrive at better decisions:

- Define the problem before you try to solve it

- Judiciously consider which decision process to follow

- Choose among alternatives, rather than accepting or rejecting a single, most-available solution

- *Focused trial and error* - Widely used for adapting to partial information. Two steps include where to start the search and checking outcomes at intervals to adjust and modify. Assumes there is important information you must proceed without; helps you find an effective choice despite lack of essential information.

- *Tentativeness* - Commitment to revise your course as needed. Views each intervention as tentative or experimental; declares that you fully expect to check and revise at intervals.

- *Procrastination* - Purposeful delay that permits collection of new evidence, processing additional data, and presentation of new options. Sometimes the problem is resolved untreated. Rarely is delay deadly, particularly when you can rebound with a timely and persuasive solution.

- *Decision staggering* - Taking action in increments helps you see the partial results of your fix, and determine if the action will be successful if fully implemented. Perhaps you are considering a series of changes to a process - testing out one change at a time will help you gauge your customer's reaction.

- *Fractionalizing* - Instead of spreading an intervention over time, you treat important judgments as a series of subdecisions, which can be staggered. This technique helps to relate to the changing circumstances and effects of your fix.

- *Hedging bets* - The less certain you are about the outcome of a fix in a given situation, the better off you are to spread your risk. This is a decision making version of avoiding the eggs-in-one-basket syndrome.

- *Maintaining strategic reserves* - Holding back resources to cover unexpected contingencies. This approach takes Murphy's Law into account.

• *Reversible decisions* – Avoids overcommitment when only partial information exists. Takes the path of least resistance until you have all the facts. You can opt for a stronger route when you see initial results. Pilot a new system and work out the bugs before you convert entirely.

*Practices to avoid in decision making*

• Groupthink

Sociologist Irving Janis analyzed why groups sometimes don't reach effective decisions. Janis labelled the negative effects of group decision making – like those listed in the group problem-solving section of this module – as "groupthink." This occurs when team members strive for consensus at the cost of realistic analysis and critical thought. Individuals suppress their ideas and normal skepticism to reach agreement and preserve human relations. Groupthink happens subconsciously – when we turn off our critical thinking in favor of reaching a decision.

What are the symptoms of groupthink?

- Concurrence is the top priority
- Attitudes are held that errors can't happen
- Members rationalize conflicting evidence
- The group adopts negative stereotypes of outsiders

Work teams are never immune to groupthink. Recognize the warning signs. Groupthink may be the root cause if consensus is reached too quickly with no questioning, or if opinions of other work groups are discounted without consideration. When you detect overconfidence in your group's powers, groupthink may be the culprit.

How can you avoid this phenomenon in group decision making?
- Openly question ideas
- Thoroughly discuss options to be sure genuine agreement is reached.
- Encourage lively discussion without personal attacks
- Recognize that the uncommon idea may be the best solution
- Keep the collective group open to unlikely sources for answers
- Lead by example
- Give your best effort without overanalysis

More information is available about groupthink from Organizational Development.

- Hidden profiles

If the majority of group members don't already know some information prior to a discussion, the chance of introducing new information is unlikely. This pattern is called a "hidden profile."

Redirecting the group's focus from already shared to unshared information is difficult but important. When you lead a group process, be aware of the role that the unshared information may play in the outcome.

If a team thinks its role is to *solve a problem*, then its goal will be to identify information and reason toward the right answer. The group will be open to new information until one alternative ermerges as the "right answer." The group will be reluctant to ignore new information.

If the group perceives its role as reaching *consensus*, it may ignore new information if familiar information has already led to agreement. New information may be discarded if it creates discord.

A problem-solving approach can help offset the tendency to disregard unfamiliar data. Avoid making consensus building your sole purpose. It can cause the group to discount important new information.

- Awfulizing

The harried decisionmaker faced with a variety of options and short deadlines can place too much emphasis on the negative possibilities associated with some alternatives. We tend to accentuate the negative when we are in a time crunch.

- Unrealistic expectations for yourself or your employees

Poor decisions occur occasionally. Accept the lessons learned and move on.

- Snap decisions

Don't do it! Take the logical steps recommended in this module - if you're pressured for time, go through the process within the schedule you have and accept your best judgment.

- Unnecessary actions

There are some events for which the best course of action is no response. Pick your battles!

- Focusing on the negative

When you face a deadline crunch, avoid oversimplification and accentuating only the risks or negative outcomes.

- Avoiding decisions

You're just fooling yourself (or setting a poor example for your employees and peers) if you avoid making a necessary decision in a timely manner. Make the tough decisions; you'll be respected over the long-term for taking the responsibility.

## E. Idea Generation Techniques

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### Enabling Objectives

Upon completion of this section, trainees will be able to:

1. Identify good practices for generating ideas.

2. Identify practices to avoid when generating ideas.

3. Given a scenario, evaluate the manager's effectiveness at applying idea generation techniques.

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We have two choices for how we "think about thinking." Expert Edward deBono says we may consider thinking as automatic as breathing, which can only be made awkward if we consciously focus on the process and try to tinker with it. On the other hand, we can approach thinking as a skill that can be improved by strengthening our logic and ability to identify fallacies in arguments.

In creative problem solving and decision making, there are best practices that are effective whether you are working individually or within a group. For simpler issues, some of the practices outlined in this module will become second nature as you continue to develop your skills for thinking on your feet. You will quickly identify the desired outcome, choose and apply a strategy, and use a variety of methods to stimulate creative thinking.

Here are some ground rules for generating ideas:

- Offer no judgments or discussion while generating ideas
- Welcome wild ideas
- Stimulate quantity
- Piggyback on others' ideas
- Honor and push beyond silences

*Idea generation methods*

- *Brainwriting*

Participants have full control of idea generation in brainwriting, which easily handles different work paces or people who are more vocal or dominant. Introverts get an opportunity to shine. Brainwriting can generate large quantities of ideas. Be prepared for duplicate ideas because participants generate ideas individually.

Begin the process with a question prompt and follow the idea generation rules. Each person gets a form divided into 15 to 18 cells – five or six rows with three cells on each row. Place one blank form in the center of the table, for the first person who finishes with one row. Each participant writes three solution ideas on the first row of a form. Words, images, symbols and sketches are all encouraged. Work without discussion.

As each person completes a row, the form is placed in the center of the table. They take another form and complete another row, thinking up new ideas. If members get stuck, they look at the other ideas on the sheet for piggybacking. Repeat the process until four to six rows are completed by each participant. Take 20 to 30 minutes for idea generation. The facilitator may evaluate the ideas during the check phase.

- *Mindmapping*

Mindmapping is a way of hooking thoughts together in an illustration. Studies of brain functions show that ideas often are produced in a nonlinear way. Mindmaps steer ideas into a more step-by-step sequence.

Some people take to mindmapping readily, while others require practice to adapt to it. The process relies on our ability to associate ideas. Instead of a question prompt, a group uses a trigger word such as "teamwork."

Put a word or problem phrase into a nucleus bubble at the center of a large sheet of paper that is posted. Create associative spinoffs as ideas cluster and trigger others. Collect the themes on paper. Some teams use spines or branches to illustrate the associations. Use one- to three-word statements. Draw arrows between thoughts that you later discover are connected. Avoid analyzing or judging at this step.

Teams can use a facilitator for mindmapping or let everyone participate on a large sheet of paper. Refrain from discussion of ideas. The group participation can build synergy when a facilitator isn't used. Individuals may create their own mindmap, then share it with the group to build a composite mindmap. Allow 20 to 30 minutes for a group, but follow your inner clock if you are working alone.

- *Analogy storm*

The analogy storm delays identification of the target until a one- to two-hour analogy journey is completed. This journey breaks participants out of mindsets. Begin with a series of target statements or wishes. Participants look to the world of analogies for ideas.

You can choose from a variety of perspectives for your analogy storm. Consider business, medicine, sports, mining, plants, animals, or science, for example. You could compare the members of your work team to a family. What is required of them to keep the family functioning? What are the characteristics of each member? How do they approach their roles? What do you need from each of them?

Participants in analogy storming gain insights about problems and decisions, and often come up with new approaches for outcomes. Discuss how those analogies can be generated into applicable solutions. Proceed to a check phase for the adopted solutions.

- *Picture tour*

Pictures can be used as a springboard to innovation. This method starts with a question prompt. Develop targets for where you or the group wish to aim your search. Proceed with four- to five-minutes of idea generation. Adjust the target statement to reflect new perspectives.

Step back from the issue by viewing slides or photographs of action, people or scenery. Extract a characteristic from each slide that intrigues you or is essential to the scene. For example, the interdependencies of nature may be noted. Participants silently develop lists. Use nine to 11 pictures, observing each for 20 to 30 seconds. The facilitator posts one or two characteristics that are most interesting to each member. Use those selected ideas to force-fit ideas that might help the target become a reality. Observe the idea generation rules. Move to the check phase.

- *Imaging the future*

This technique stimulates the imagination by looking into the future as if you had a crystal ball. Participants speculate and pose new possibilities. The method can produce proposals for new facilities or projects, research and development, or keeping an organization at the cutting edge.

Start with a question prompt to focus on the desired outcome. Create a variety of mental images. The facilitator collects those images on a large sheet of posted paper. Thirty minutes is the average time necessary for this part of the process. Analyze the best prospects to determine what might inhibit or facilitate each outcome or role.

- *Brainstorming*

First popularized in the 1950s by Alex Osborn, this simple process can assure that you produce a creative strategy if the steps are followed properly. A question prompt provides focus.

During the brainstorming process, members call out their ideas. The scribe catches the thoughts as quickly as possible. The process flows freely for 20 to 30 minutes. If you are working individually, write your ideas on a sheet of paper or stand at a board so you can move around while you think. Another variation involves use of a tape recorder to gather your ideas, possibly while you are traveling.

If you use a team approach to brainstorming, limit to five to eight participants, if possible. You can eliminate the scribe by giving each person a different colored marker to let all members get involved in writing down ideas on several sheets of posted paper. Drawings are welcome.

Contact Productivity, Quality and Communications or Professional Development for additional information about idea generation techniques.

## Critical Incident
## Effective Behavior

Occurrence: A group of Waste Isolation Division, WIPP Project Site Office and WIPP Project Integration Office (WPIO) managers were scheduled to meet to identify ideas to get the WIPP to a disposal decision. The WID manager coordinating the meeting decided that using an idea-generation technique would be helpful. The manager contacted Organizational Development and asked for a facilitator to lead the idea-generation session. The meeting facilitator used the brainwriting technique.

Impacts: 1) Participants generated more than 100 ideas in less than half an hour. A number of the ideas were judged by meeting participants to be worthy of implementation. 2) The WPIO manager chairing the meeting was pleased by the number of useful ideas generated.

Lessons Learned: 1) Idea generation techniques can be helpful for stimulating creative thought. 2) Facilitators can boost productivity by suggesting an idea generation technique that is appropriate for the purpose of the meeting, as well as for the group dynamics.
3) There are a number of useful idea generation techniques. Don't rely exclusively on brainstorming.

## F. Fostering an Innovative Work Environment

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### Enabling Objectives

Upon completion of this section, trainees will be able to:

1. Identify good practices for developing an innovative work environment.
2. Identify practices that discourage innovative work.
3. Given a scenario, evaluate the manager's effectiveness at fostering an innovative work climate.

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### 1. Challenging illogical thinking

The more logically we think, the less we simply take other people's word as evidence about an issue. We methodically analyze statements for logic versus fallacies. Robert Gula's book, "Nonsense and How to Overcome It," recommends some steps that expand logic capabilities.

Recognize when you, your employees, or others adopt these illogical practices:

- Speaking in absolutes, such as *all, none, no one, everybody, never* or *always*
- Generalizing that is either unsupported or supported by only one or two examples
- Use of emotional language to sway opinion
- Confusing opinion with evidence
- Adopting conclusions that don't follow logically from the evidence
- Excluding unfavorable or unsupportive data from evidence

Being effective at solving problems in the workplace (and throughout life) requires using a combination of memory, logic and insight. Your experiences combined with your logic abilities help you determine which problem-solving method is best for each challenge you encounter. Try out some of the creative and innovative thinking practices presented in this module.

### 2. Thinking clearly about problems and decisions

In "The Art of Clear Thinking," Rudolf Flesch acknowledges that the manager's and supervisor's day is full of incomplete or ambiguous information on which you must base decisions. You may need to guesstimate the impact of your actions. There is considerable creative thinking within our project -

searches for strategic solutions for the test phase, increasing productivity in response to shrinking resources, applying shared practices that improve work processes. Each decision that we *don't* make is a decision, too.

*Good practices for solving problems:*

- Write the problem down
- Translate the problem
  - Use plain English
  - Use figures, mathematical symbols or graphs
- Don't rely on your memory - go directly to printed information sources
- Know how to use the library
- Take notes and keep files
- Discuss the problem with others who can help
  - Be resourceful. Consider talking with peers, your DOE counterparts, counterparts at other sites, your boss, professional organizations, professors and other recognized experts in the field, your employees
- Use a checklist of categories - add new ones periodically
- Turn the problem upside down - look at it from a different angle
- Don't be afraid of the so-called ridiculous
- Frustrated? Put it down, relax, turn to other work, and come back later
- Approach major challenges when you are rested
- Take time for solitude; clear away the trivia; shut out interruptions
- Be aware of the time of day when your mind works best - adjust your schedule
- When you get an idea, write it down

### 3. Lessons learned

What can managers and supervisors learn from mistakes in problem solving and decision making? You can start by setting a good example for your employees. There's a certain amount of risk we must accept in the workplace, even when we consistently use a logical approach.

Determine within your work group how much risk is acceptable to you and to your employees. Ask your employees to communicate before, during, and after the decision-making process about problems or mistakes. Problem solving during a decision process is a good practice.

Use questioning techniques to understand your employees' frame of reference. For example, "Why do you think that happened?" or "What can you do to resolve that problem?" are ways to find out what employees think went wrong, and to empower them to fix the problem themselves. You don't have to know all the answers! Open-ended questions can't be answered with yes or no, and they elicit information by encouraging your employees to talk.

Confirm information by asking closed-ended questions, which require a yes or no response. These are questions such as, "Have you completed your report?" or "Is that deadline a problem for you?" The closed-ended question helps you confirm if the message has gotten through clearly.

Your employees learn a great deal by the way you answer their questions. When an employee recommends a particular action and the boss doesn't question the strategy, the employee assumes that is an acceptable behavior. Encourage your employees to think through a process, rather than jumping to a conclusion. Ask if they have checked out their action plan with others who will be affected. Determine if they know about following the chain of command. Ask if they have looked up the procedure for a task. Reinforce good practices.

Through questioning, guidance, and coaching, you can help your employees develop good habits to solve problems and make better decisions. Asking questions like, "What other alternatives did you consider?" help you check out an employee's decision-making process. This is more effective than asking only about the alternative you would choose.

There's no place in effective lessons learned for "I told you so," or Monday morning quarterbacking. Structure your work environment so your employees learn the best practices for solving problems and making decisions within the resources and schedule available. Ensure that they know they can ask for advice when they need help. Keep communication lines open. You and your employees should reach an understanding of how much and how often information will be shared during a decision process. Set the standard for no surprises.

Create what some managers call a "learning organization." We can learn from occasional mistakes without defusing employees' motivation.

### 4. Managing the work climate

Motivate your employees to seek creative solutions. Skill at motivating is considered the most important element in managing group creativity. Motivation gives momentum to other elements of group creativity:

- Determining your resources
- Establishing a creative climate
- Zeroing in on the content of a problem or decision
- Selecting a process
- Producing the product

It's easy to ignore our creative potential and that of our employees if we let "putting out fires" become our mode of operation. In crisis mode, our priorities are selected for us. How can you minimize firefighting? Determine with your work group how much time is necessary for creative problem solving and for routine problem solving. You can figure that out by examining the type of problems your group regularly deals with. Predictable problems don't require elaborate decision making. Complex challenges require a more planned approach.

Consider your employees' work styles and discuss preferred approaches *before* a major issue arises. Some formats for creative thinking will fit your work group and the decisions you make better than others. For example, brainwriting works successfully for a mixed group of extroverts and introverts. Brainstorming is effective when the facilitator draws out all participants and disallows judgmental comments. Your group may decide that mindmapping inhibits participation if your employees aren't comfortable with the freewheeling process.

*Individual versus group decision making*

How do you decide whether you or one of your employees can resolve a problem individually, or if group decision making is necessary? In "Managing Group Creativity," author Arthur VanGundy offers a checklist for deciding between individual or group approaches:

1. How much time do you have to reach a solution?
2. Could you get more time to reach a solution?
3. Will your employees accept your solution if you don't involve them?
4. How important to your employees is acceptance of this solution?
5. Will your employees be reluctant to implement this solution if they don't participate?
6. Do the advantages of resolving the problem by yourself outweigh the need for original solutions?
7. How important is it for your employees to interact with each other while solving this problem?
8. Do the advantages of solving this problem by yourself outweigh your employees' need to interact?
9. How much information do you have about this problem?
10. How useful is the information you have with respect to making a decision by yourself?
11. Is it important that your employees become more cohesive?
12. Do the advantages of solving this problem alone outweigh the need for more cohesiveness?
13. How important is it for your employees to develop creative problem-solving skills?

14. Do the advantages of resolving the problem by yourself outweigh developing your employees' problem-solving skills?

15. Will interpersonal conflict develop if you try to solve this problem as a group?

16. Do the advantages of solving the problem by yourself outweigh the chance of conflict among your employees?

Rate each question from 1 to 3, (*yes, maybe, no* or *lots of impact, moderate impact, or no impact* ) with 1 causing the least impact and 3 having the most impact. The pattern of your responses should give you enough information to decide whether the circumstances or decision warrant individual or group problem solving.

*Creating a learning organization*

How do you maintain an environment that gets the best from your employees, whether they are analytical thinkers, team decision makers, lone rangers, reticent risk-takers, or bottom-line seekers? You can support each type of employee with a flexible environment. You will reap the benefits of more efficient problem solving and decision making when your employees operate in a climate that builds their success.

Be an effective listener. Resist the temptation to evaluate until you hear an employee out. Resist distractors - ringing phones, checking the clock, visitors, outside noise.

- Avoid rushing or being impatient - that's a real demotivator to your employees
- Ask objective questions
- Encourage clarification
- Don't assume your employee is either correct or incorrect
- Repeat what you think you are hearing
- Ask for feedback
- Ask the employee if they want you to take action. They may just want you to listen!

Effective problem solving and decision making are preferred behaviors at the WIPP. These good practices help you and your employees build what is often called a "learning organization," where employees regularly tackle stretch assignments, challenge ineffective processes, and offer creative solutions with confidence.

How can we ensure that learning continues at WID? Lifelong learners read a lot - books, journals, and other information both related and unrelated to the job. Stay alert for new ideas and information that can enhance your professional knowledge and understanding of the big picture as it relates to WID and the DOE, or to industry and the economy in general.

Anticipate how you might be called upon to use new information. Make it a practice to ask questions of subject matter experts when you require more information to evaluate issues or trends. Effective learners also learn from mistakes, and help employees develop strategies to avoid making the same error. Freely share information with your employees and encourage them to share knowledge that keeps others in the organization out of pitfalls.

*Good practices*

- Provide freedom to try new methods
- Balance the pressure of deadlines with sponsored innovation
- Provide realistic, but challenging goals
- Minimize direct supervision as much as possible
- Delegate responsibility where practical
- Encourage participation in decision making and goal setting
- Encourage the use of creative problem solving for unstructured problems
- Listen effectively and watch for nonverbal signals
- Provide timely performance feedback
- Provide resources and support priority work to completion
- Provide help in developing ideas
- Encourage open expression and different ideas
- Encourage risk taking and buffer negative forces
- Provide time for individual efforts
- Encourage professional growth and development
- Foster interaction and cooperation with other work groups
- Tell your employees frequently that you have confidence in their abilities

*Practices to avoid*

- Shooting the messenger

Coach your employees in advance. Let them know they may consult you during the process when they need help.

- Requiring the same approach by each employee
- Setting rigid rules and deadlines
- Discouraging questions
- Discounting ideas that lack documentation or cost estimates
- Equating solitude or planning time with nonproductivity
- Not delegating stretch assignments
- Failing to reinforce good practices
- Stealing employees' credit
- Reducing initiative by micro-managing
- Requiring a perfect success rate
- Asking "20 questions"

Avoid discouraging an employee who has a new idea by asking a series of nitpicky questions or burying them in "what-if" scenarios. Details come later!

## G. Smart Moves – What You Can Do Now

Here are some practices you can apply now so that your department/section will benefit from effective problem solving, decision making, and creative thinking:

- Introduce your employees to the steps in the problem-solving process. (Page 5)
- Take the "Root Cause Analysis" course, TRG-296. (Page 8)
- Use good practices for leading meetings and for groups you facilitate. (Page 12)
- Have a tough, new assignment? Looking for productivity enhancement options? Apply the four phases of the creative cycle. (Page 13)
- Assess your decision-making style. (Page 20)
- Coach your employees on decision making. Lead by example. (Page 25)
- Discuss "groupthink" and "hidden profiles" at your next workplace meeting. Videos and articles are available from Organizational Development. (Pages 27 and 28)
- Give a copy of the idea generation rules to everyone on your work team. (Page 31)
- Form a process improvement team (WesTIP) to work on a problematic process with at least one other WIPP organization – WID, SNL, or DOE. (Pages 30 to 35)
- Use questioning techniques to understand your employees' frame of reference for problem solving and decision making. (Pages 38 and 39)
- Pick one problem or decision this month to resolve with group decision making. Decide whether the problem is suited to group decision making by applying the VanGundy checklist. (Page 40)
- Be an effective listener. (Page 42)
- Create a learning organization. (Pages 42 and 43)

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## I. Practice Test

1. What's the first step to solving a problem?

   a) Write a detailed memo to your boss.
   b) Define the problem.
   c) Ignore it and hope it goes away.
   d) Establish your strategy so you can win any argument about the problem.
   e) Find out who is responsible for the problem.

(B.1)

2. Why does WIPP use root cause analysis (RCA)?

   a) DOE Order 5480.18A requires the use of root cause analysis.
   b) The DOE requires every employee to learn RCA in General Employee Training.
   c) Experts have determined that RCA is the only proven method for analyzing events.
   d) RCA has proven effective for commercial nuclear facilities and other industries.

(B.1)

3. An employee is leading a root cause analysis team. Because the team is sorting through a number of assumptions about what went wrong, she decides to use change analysis.
Was this a good practice? Why?

   a) Yes – change analysis is easy to apply because you don't worry about asking the "right" questions.
   b) Yes – change analysis can take you quickly past assumptions and forward to finding the root cause.
   c) No – employees shouldn't lead root cause analysis teams; only managers and supervisors lead RCA teams.
   d) No – the RCA method must be approved for use by Emergency Management prior to its use.

(B.3)

4. The problem-solving group a manager is facilitating begins arguing and reaches an impasse. Which of the following questions is a good practice?

   a) What information do you require to support a decision?
   b) Are you people brain-dead? Why can't you reach consensus?
   c) Can you reach consensus if you vote?
   d) Why can't you make a unanimous decision?

(B.3)

5. A manager pays attention to what his employees say and their behavior, e.g., their tone of voice, facial expression, or silence. Is this a good practice? Why?

a) Yes - managers and supervisors should modify their assignments whenever they get negative feedback from their employees.
b) Yes - managers and supervisors should be alert to both verbal and behavioral feedback from their employees.
c) No - good managers and supervisors teach their employees to mirror their behavior at all times.
d) No - this is a waste of the manager's time; employees' nonverbal behavior is irrelevant.

(B.1)

6. A manager's work team needed a new software system, but they didn't know which to buy. They listed all the characteristics of their desired solution. Was this a good practice? Why?

a) Yes - By describing the features, you can build the solution.
b) Yes - after listing the desired features, the solution is always obvious.
c) No - you should find a simpler issue to resolve.
d) No - you should always start with a solution and work backwards.

(C.3)

7. "Groupthink" occurs when

a) any group fails to reach an effective decision.
b) team members strive for consensus at the cost of realistic analysis.
c) groups don't work together to reach a unanimous decision.
d) any group member openly questions the ideas of others.

(D.2)

8. A manager wanted to offset the "hidden profile" pattern when her work team was making a decision. She asked them to take a problem-solving approach, and consider all information to reach the best solution. Was this a good practice? Why?

a) Yes - the group now will be open to new information to reach the right answer.
b )
Yes - managers should steer work teams toward pre-determined best solutions.
c) No - she should have instructed her work team to reach consensus.
d) No - the manager's approach could cause conflict, which should be avoided at all costs.

(D.2)

9. A group facilitator was leading an idea generation session. Which of the following is a good practice?

a) Allow everyone to call out ideas simultaneously.
b) Offer no judgments during idea generation.
c) Ridicule and discard wild ideas.
d) Stop after the first silence.

(E.1)

10. A manager encourages his employees to reserve time alone during each day for planning and generating ideas. Is this a good practice? Why?

a) Yes - this provides his employees uninterrupted planning time for producing innovative ideas.
b) Yes - planning time is valuable, but the manager should limit that to one time of day for all his employees.
c) No - employees should always dream up new ideas on their own time. The manager and his employees were wasting work time.
d) No - the manager's expectations are too high; he shouldn't expect them to plan or generate ideas.

(F.1)

## J. Answers and Feedback for the Practice Test

1. b) Define the problem.

2. d) RCA has proven effective for commercial nuclear facilities and other industries.

3. b) Yes - change analysis can take you quickly past assumptions and forward to finding the root cause.

4. a) What information do you require to support a decision?

5. b) Yes - managers and supervisors should be alert to both verbal and behavioral feedback from their employees.

6. a) Yes - By describing the features, you can build the solution.

7. b) team members strive for consensus at the cost of realistic analysis.

8. a) Yes - the group now will be open to new information to reach the right answer.

9. b) Offer no judgments during idea generation.

10. a) Yes - This provides his employees uninterrupted planning time for producing innovative ideas.